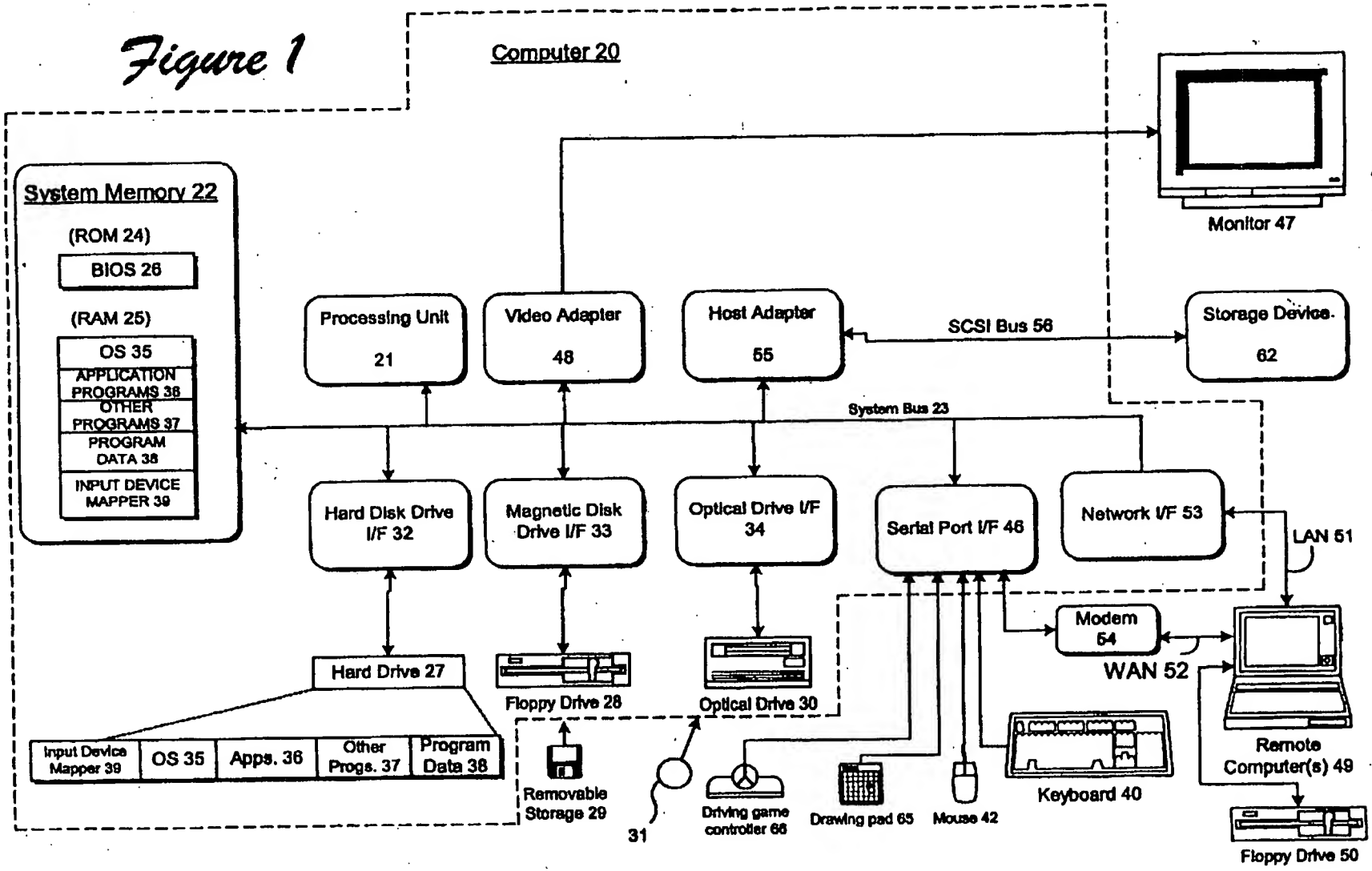
Figure 1


Computer 20
System Memory 22
(ROM 24)
BIOS 26
(RAM 25)
OS 35
APPLICATION PROGRAMS 36
OTHER PROGRAMS 37
PROGRAM DATA 38
INPUT DEVICE MAPPER 39
Processing Unit 21
Video Adapter 48
Host Adapter 55
SCSI Bus 56
Storage Device 62
Monitor 47
System Bus 23
Hard Disk Drive I/F 32
Magnetic Disk Drive I/F 33
Optical Drive I/F 34
Serial Port I/F 46
Network I/F 53
LAN 51
Modem 54
WAN 52
Hard Drive 27
Floppy Drive 28
Optical Drive 30
Input Device Mapper 39
OS 35
Apps. 36
Other Progs. 37
Program Data 38
Removable Storage 29
31
Driving game controller 66
Drawing pad 65
Mouse 42
Keyboard 40
Remote Computer(s) 49
Floppy Drive 50

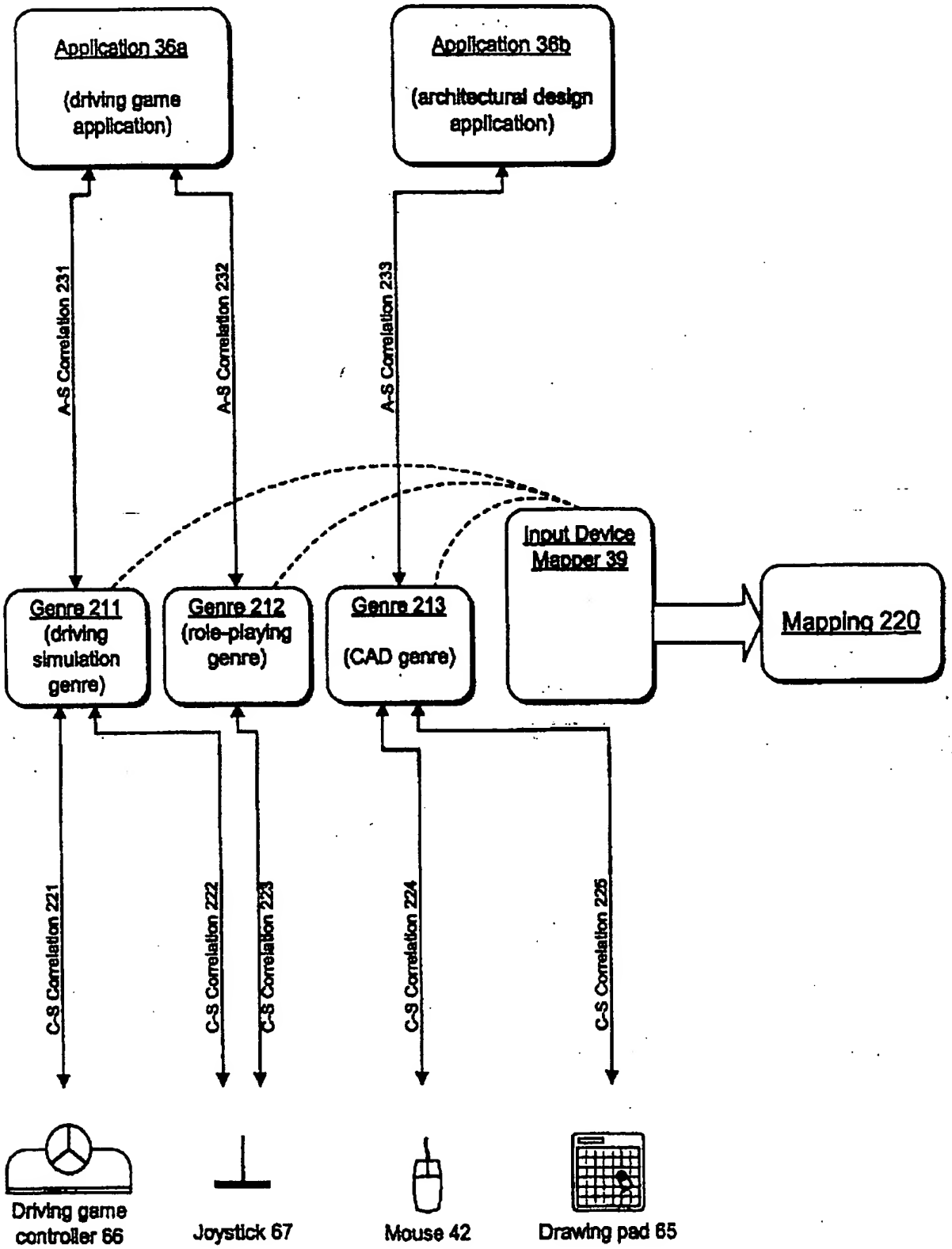

Application 36a
(driving game application)
Application 36b
(architectural design application)
A-S Correlation 231
A-S Correlation 232
A-S Correlation 233
Input Device Mapper 39
Genre 211 (driving simulation genre)
Genre 212 (role-playing genre)
Genre 213 (CAD genre)
Mapping 220
C-S Correlation 221
C-S Correlation 222
C-S Correlation 223
C-S Correlation 224
C-S Correlation 225
Driving game controller 66
Joystick 67
Mouse 42
Drawing pad 65

Figure 2

Figure 3

C-S Correlation 221

CONTROL ON DEVICE 66	SEMANTIC
Trigger 1	FIRE
Button 1	SHIFT UP
Steering Wheel	STEER
Right Pedal	ACCELERATE
Left Pedal	DECELERATE
Button 2	TALK
Vibrate	RUMBLE
.	.
.	.
.	.

301

302

Figure 4

A-S Correlation 231

ACTION IN APPLICATION 36a	SEMANTIC
turn left or right	STEER
speed up	ACCELERATE
slow down	DECELERATE
change to next higher gear	SHIFT UP
fire machine guns	FIRE
change dash display	DASHBOARD
feedback	RUMBLE
.	.
.	.
.	.

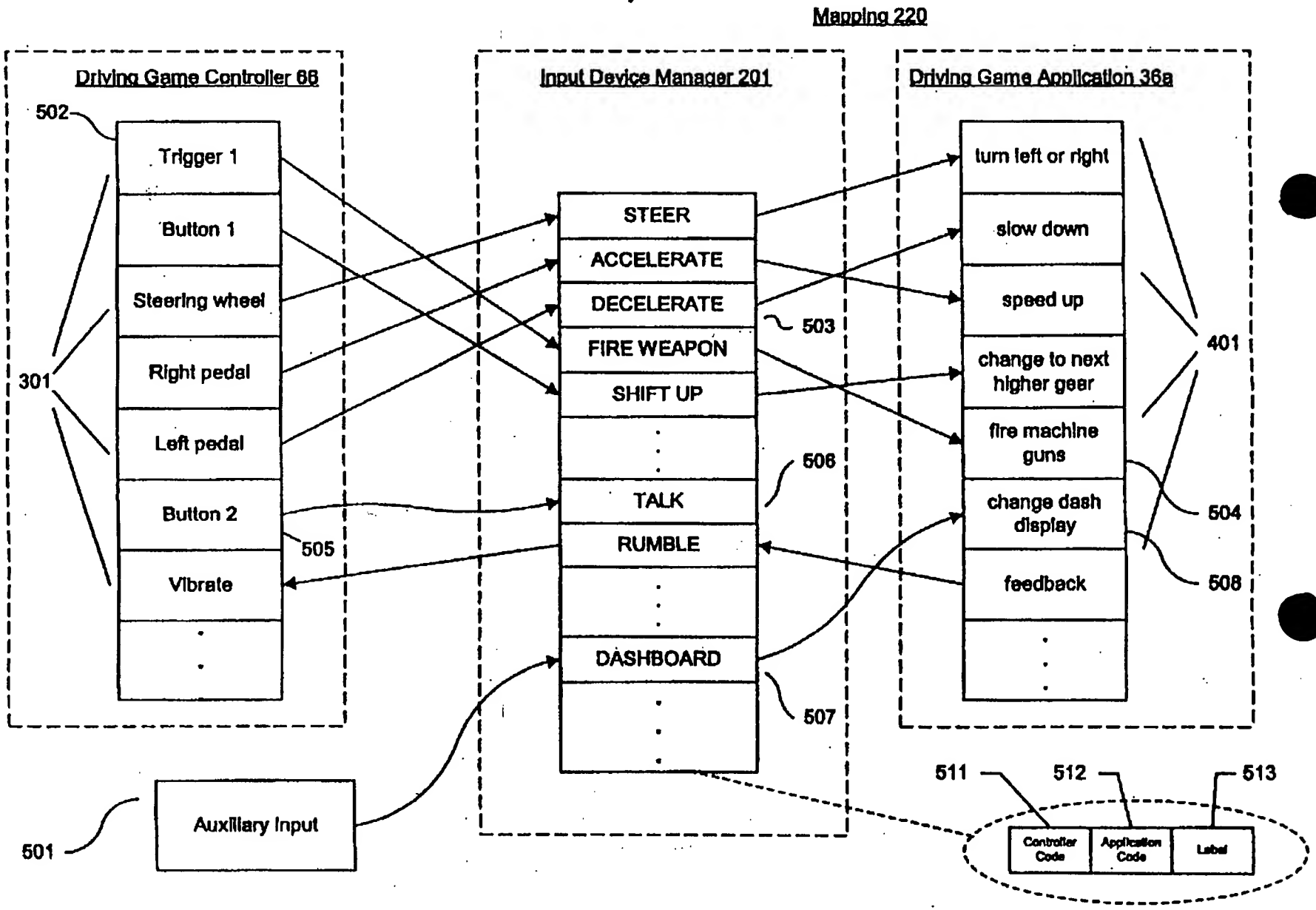
401

402

Inventors: Evans et al.
Title: APPLICATION PROGRAMMING INTERFACE THAT MAPS INPUT DEVICE CONTROLS TO SOFTWARE ACTIONS
Application No. 09/855,274

T04280"4255960

Figure 5



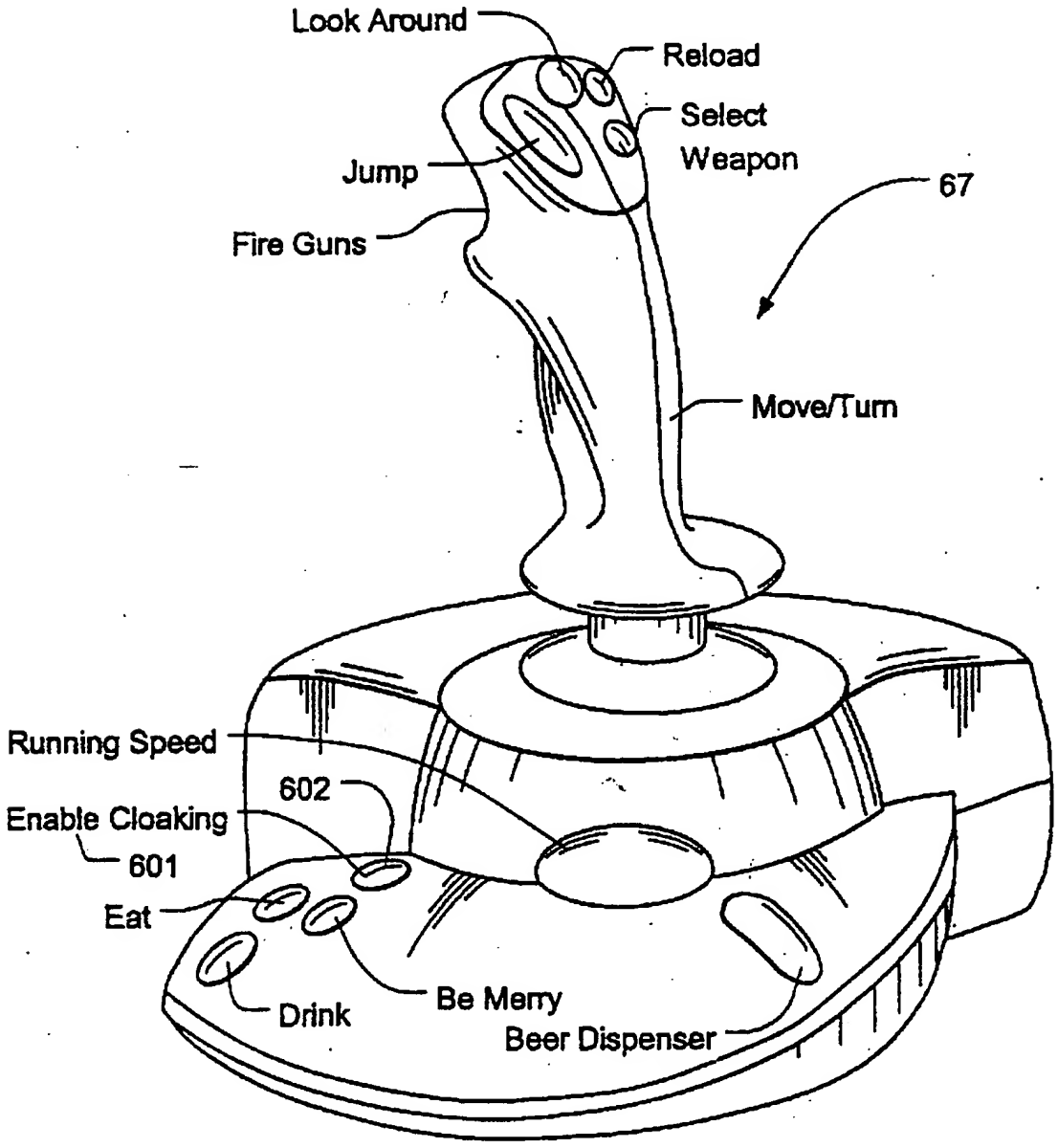
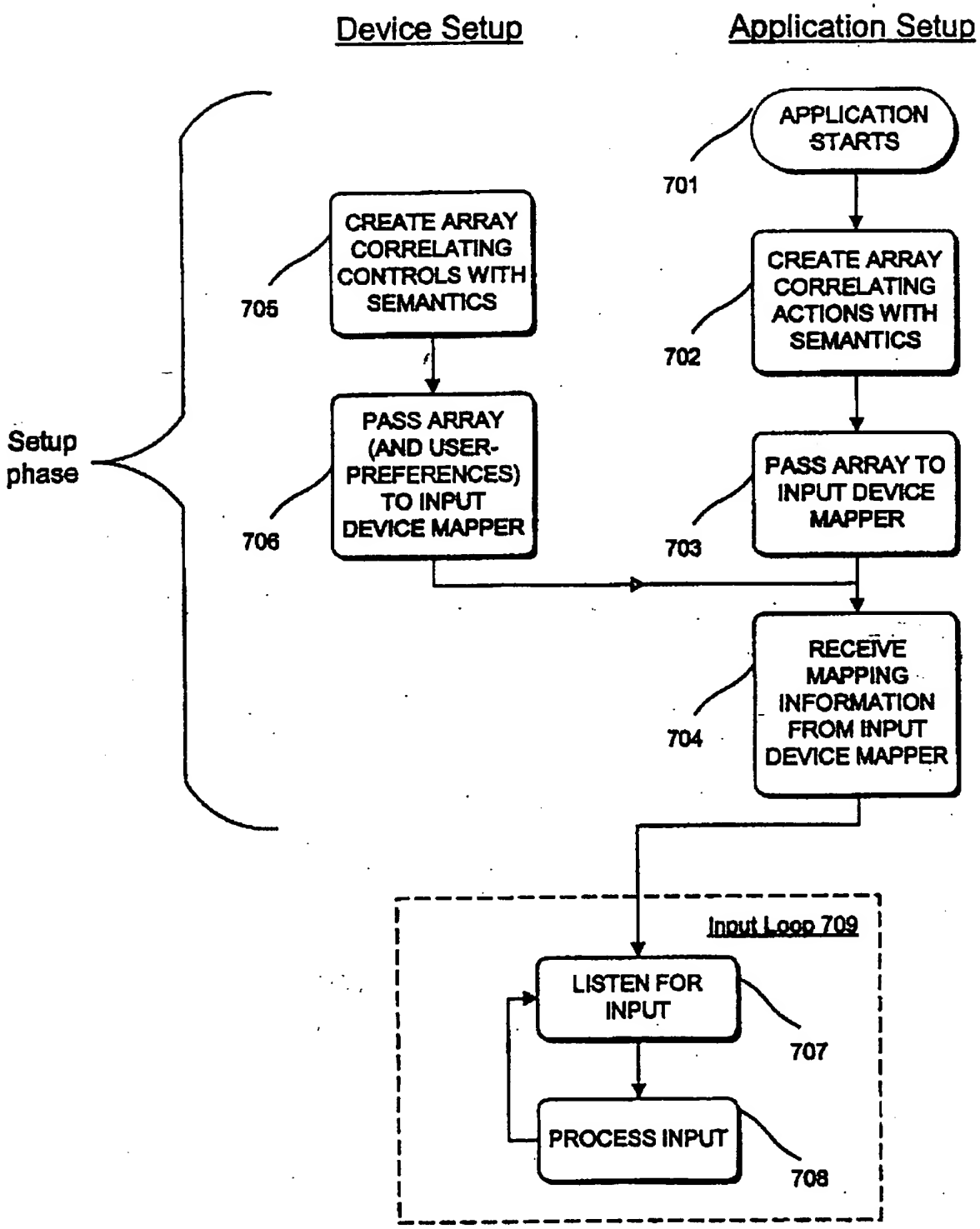

Look Around
Reload
Select
Weapon
Jump
67
Fire Guns
Move/Turn
Running Speed
602
Enable Cloaking
601
Eat
Be Merry
Drink
Beer Dispenser

Figure 6

Figure 7


Device Setup
Application Setup
Setup phase
APPLICATION STARTS
701
CREATE ARRAY CORRELATING CONTROLS WITH SEMANTICS
705
CREATE ARRAY CORRELATING ACTIONS WITH SEMANTICS
702
PASS ARRAY (AND USER-PREFERENCES) TO INPUT DEVICE MAPPER
706
PASS ARRAY TO INPUT DEVICE MAPPER
703
RECEIVE MAPPING INFORMATION FROM INPUT DEVICE MAPPER
704
Input Loop 709
LISTEN FOR INPUT
707
PROCESS INPUT
708

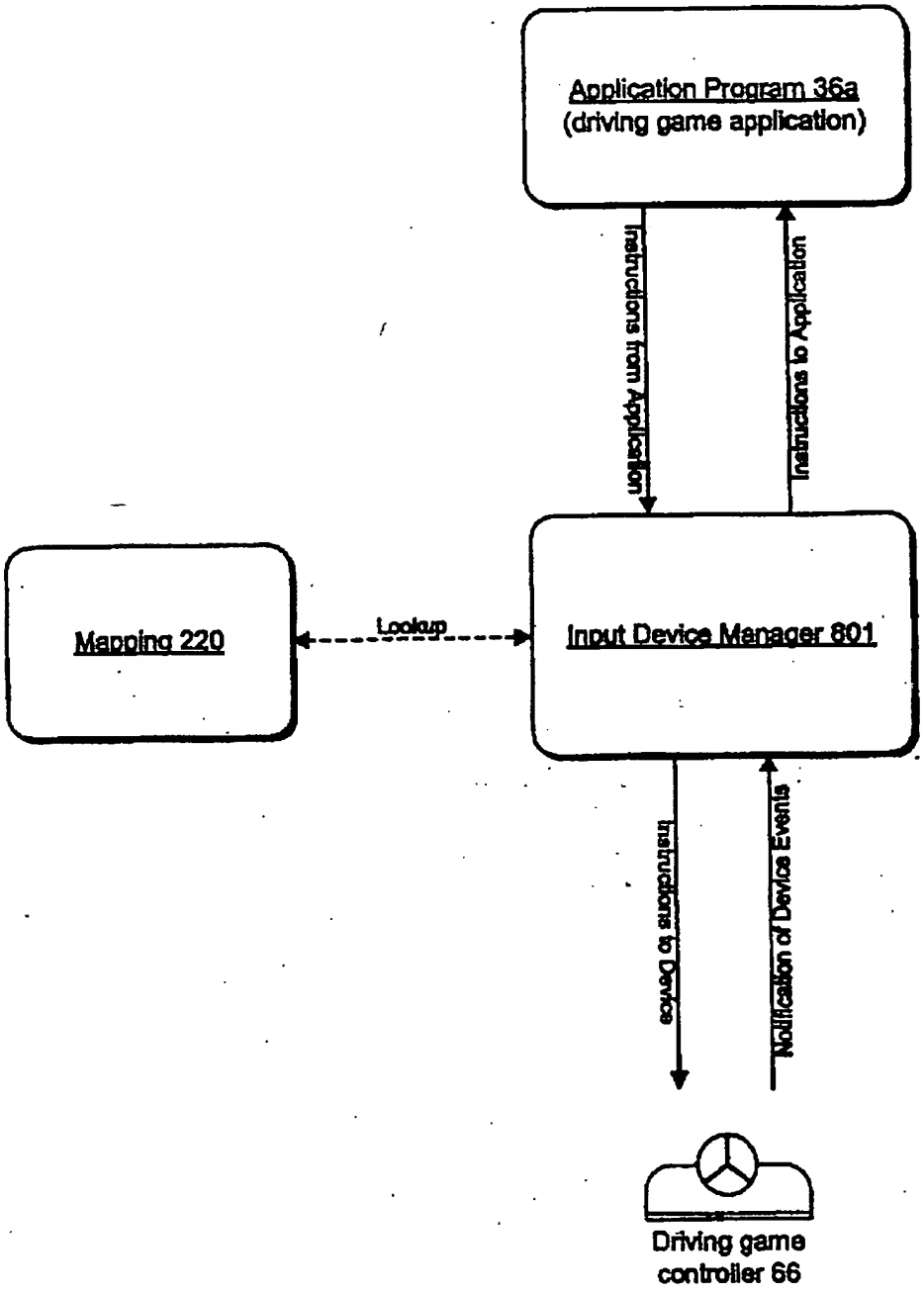

Application Program 36a
(driving game application)
Instructions from Application
Instructions to Application
Mapping 220
Lookup
Input Device Manager 601
Instructions to Device
Notification of Device Events
Driving game
controller 66

Figure 8

Figure 9

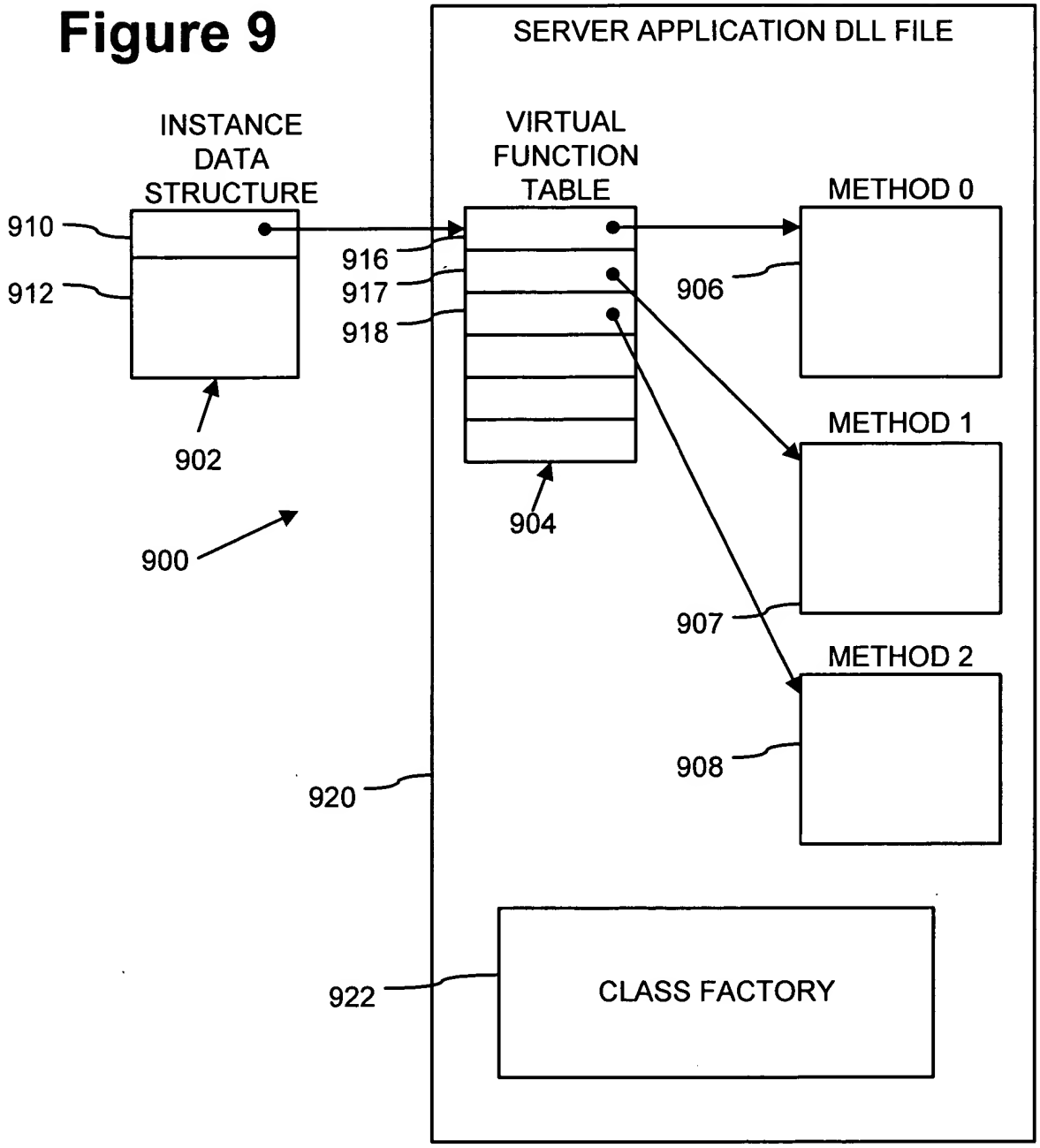

SERVER APPLICATION DLL FILE
INSTANCE DATA STRUCTURE
VIRTUAL FUNCTION TABLE
METHOD 0
METHOD 1
METHOD 2
910
912
916
917
918
906
907
908
902
904
900
920
922
CLASS FACTORY

Figure 10

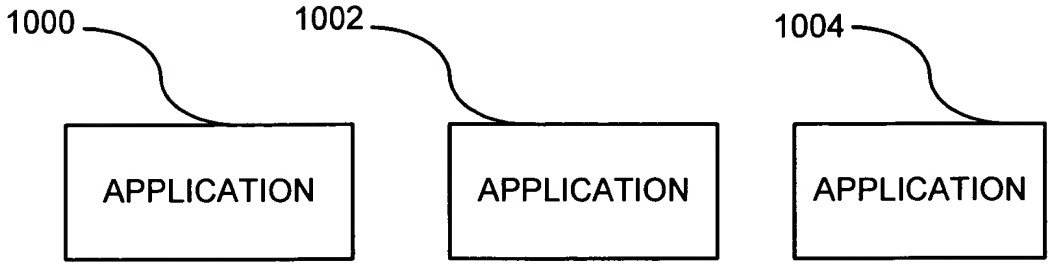


Figure 11

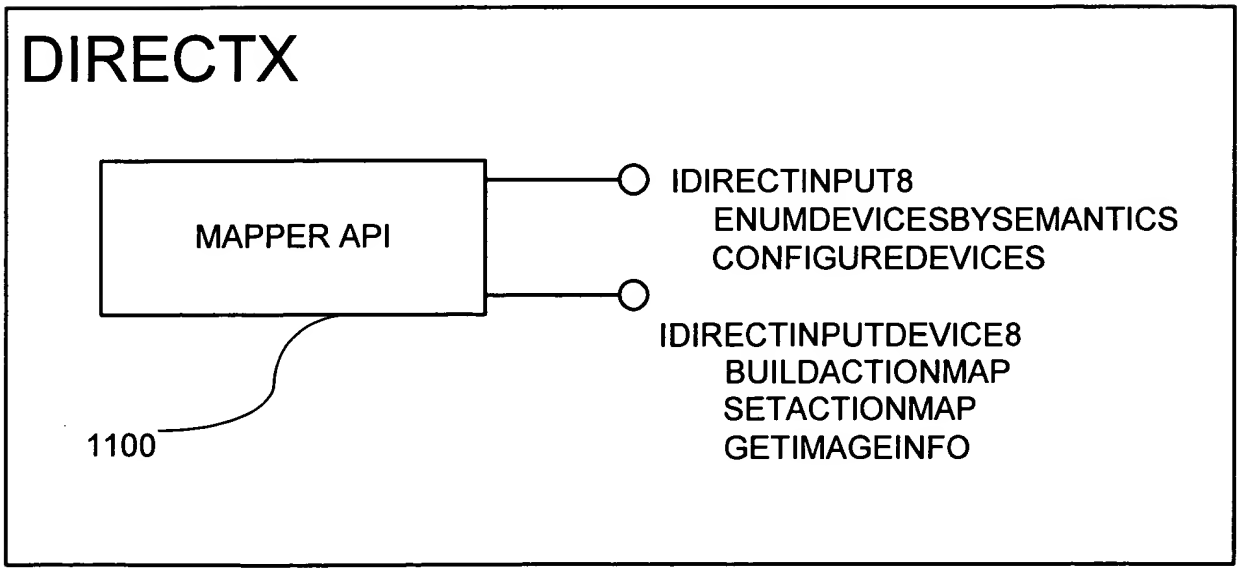
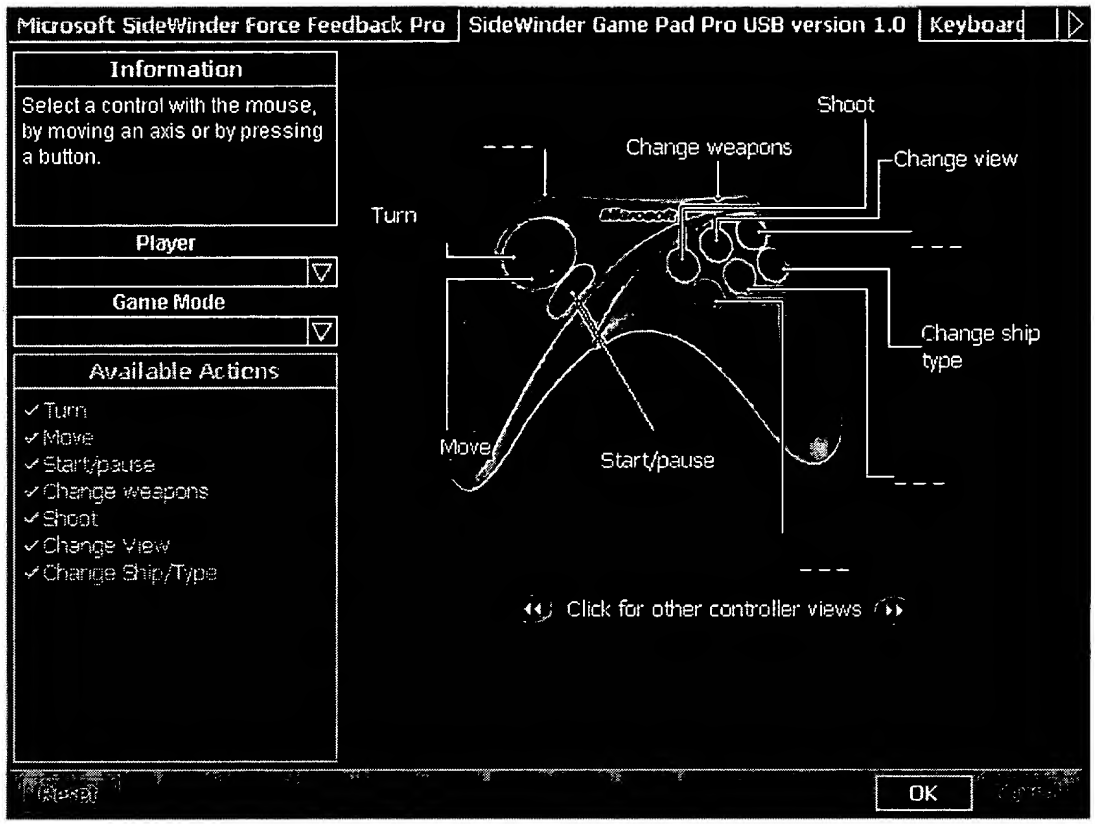


Figure 12


Microsoft SideWinder Force Feedback Pro
SideWinder Game Pad Pro USB version 1.0
Keyboard
Information
Select a control with the mouse, by moving an axis or by pressing a button.
Player
Game Mode
Available Actions
✓Turn
✓Move
✓Start/pause
✓Change weapons
✓Shoot
✓Change View
✓Change Ship/Type
Shoot
Change weapons
Change view
Turn
Change ship type
Move
Start/pause
Click for other controller views
OK

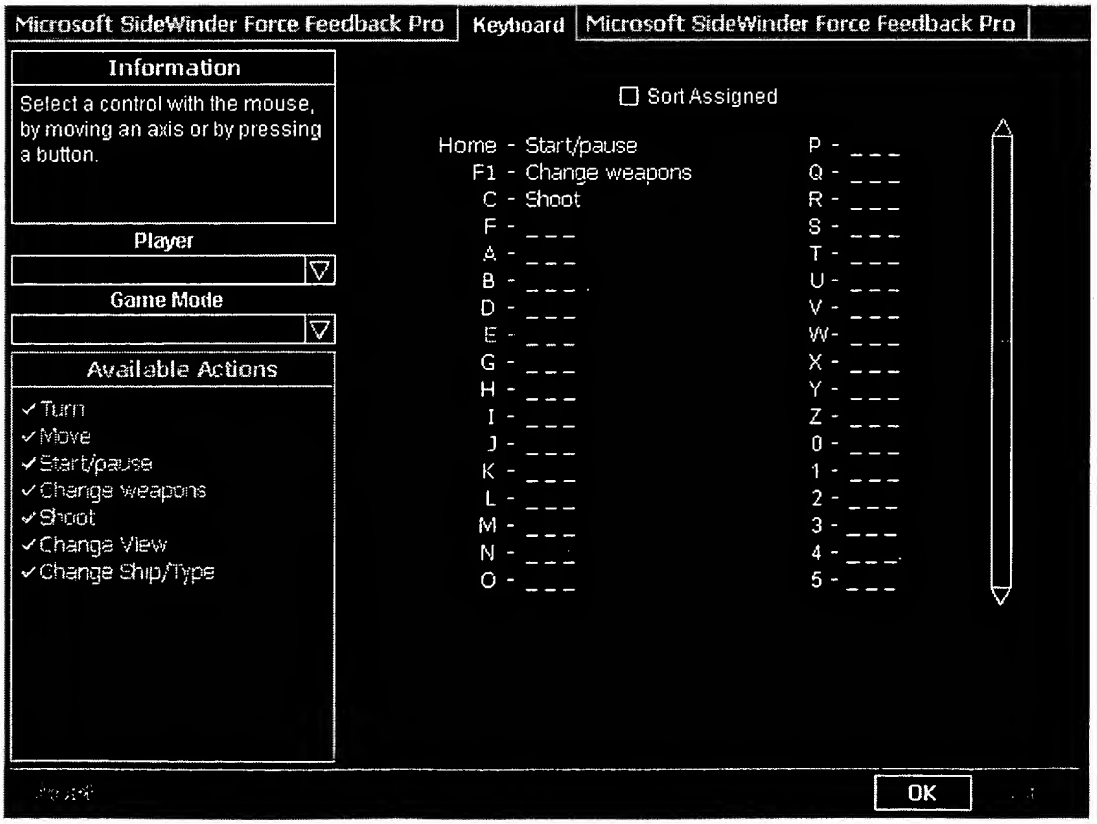

Microsoft SideWinder Force Feedback Pro
Keyboard
Microsoft SideWinder Force Feedback Pro
Information
Select a control with the mouse, by moving an axis or by pressing a button.
Player
Game Mode
Available Actions
✓Turn
✓Move
✓Start/pause
✓Change weapons
✓Shoot
✓Change View
✓Change Ship/Type
Sort Assigned
Home - Start/pause
F1 - Change weapons
C - Shoot
F - ___
A - ___
B - ___
D - ___
E - ___
G - ___
H - ___
I - ___
J - ___
K - ___
L - ___
M - ___
N - ___
O - ___
P - ___
Q - ___
R - ___
S - ___
T - ___
U - ___
V - ___
W - ___
X - ___
Y - ___
Z - ___
0 - ___
1 - ___
2 - ___
3 - ___
4 - ___
5 - ___
OK

Figure 13

ENUMDEVICESBYSEMANTICS

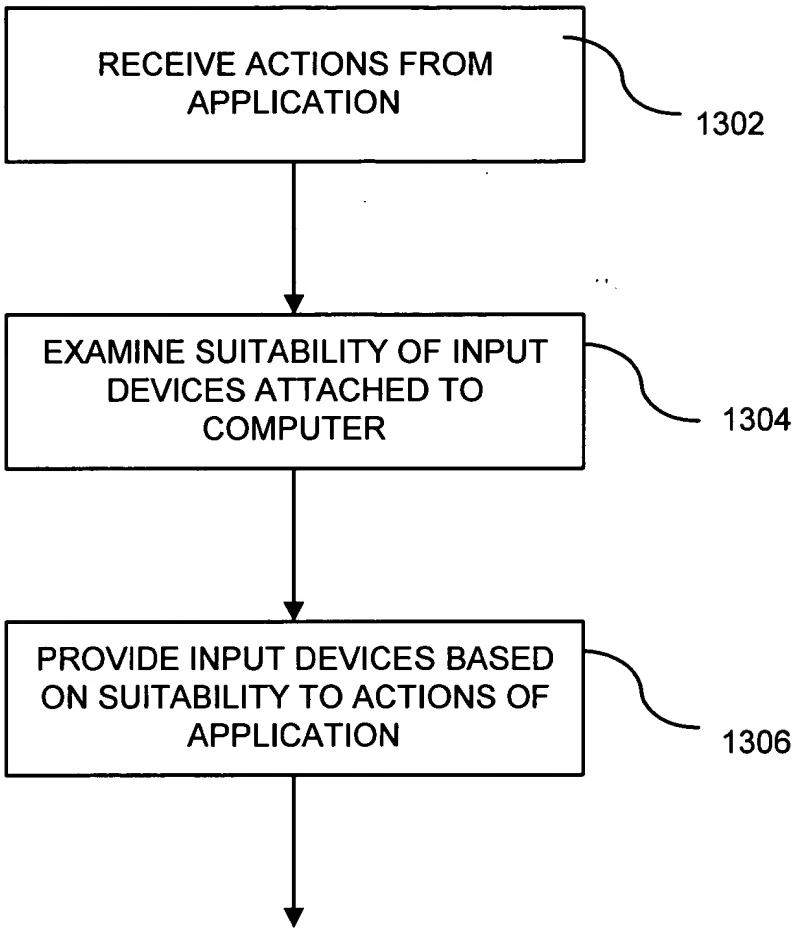


Figure 14

CONFIGDEVICES

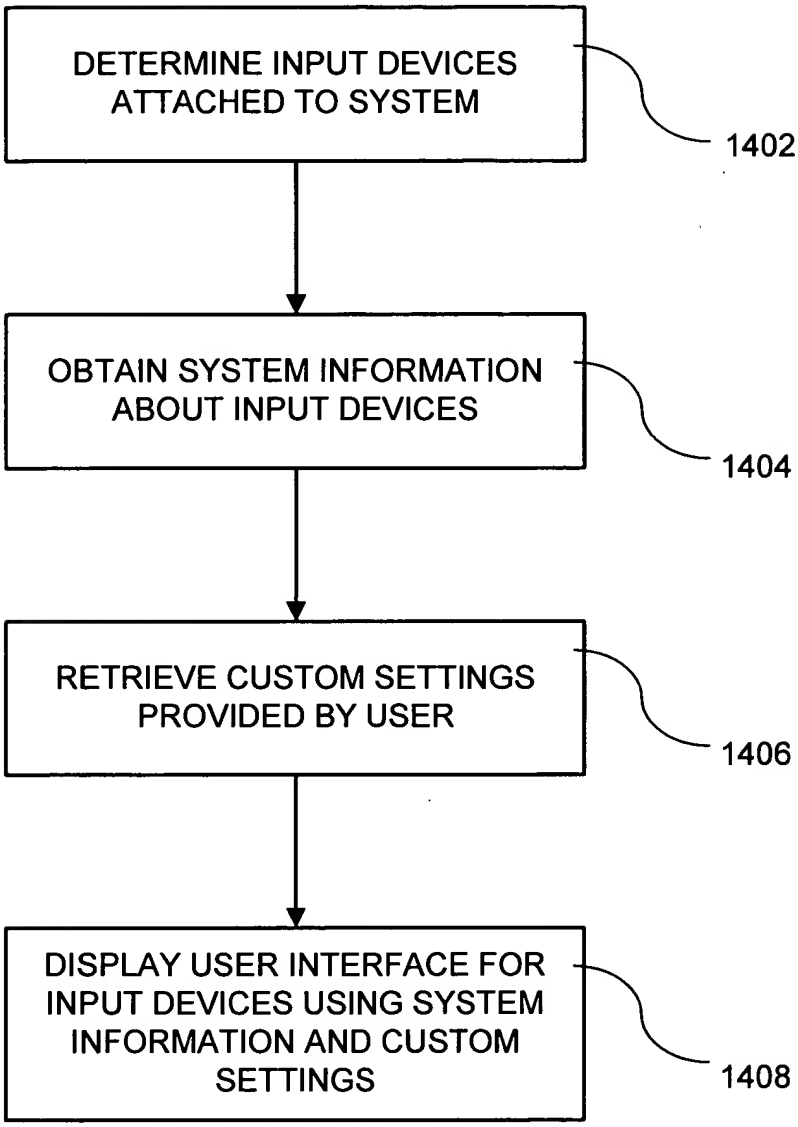


Figure 15

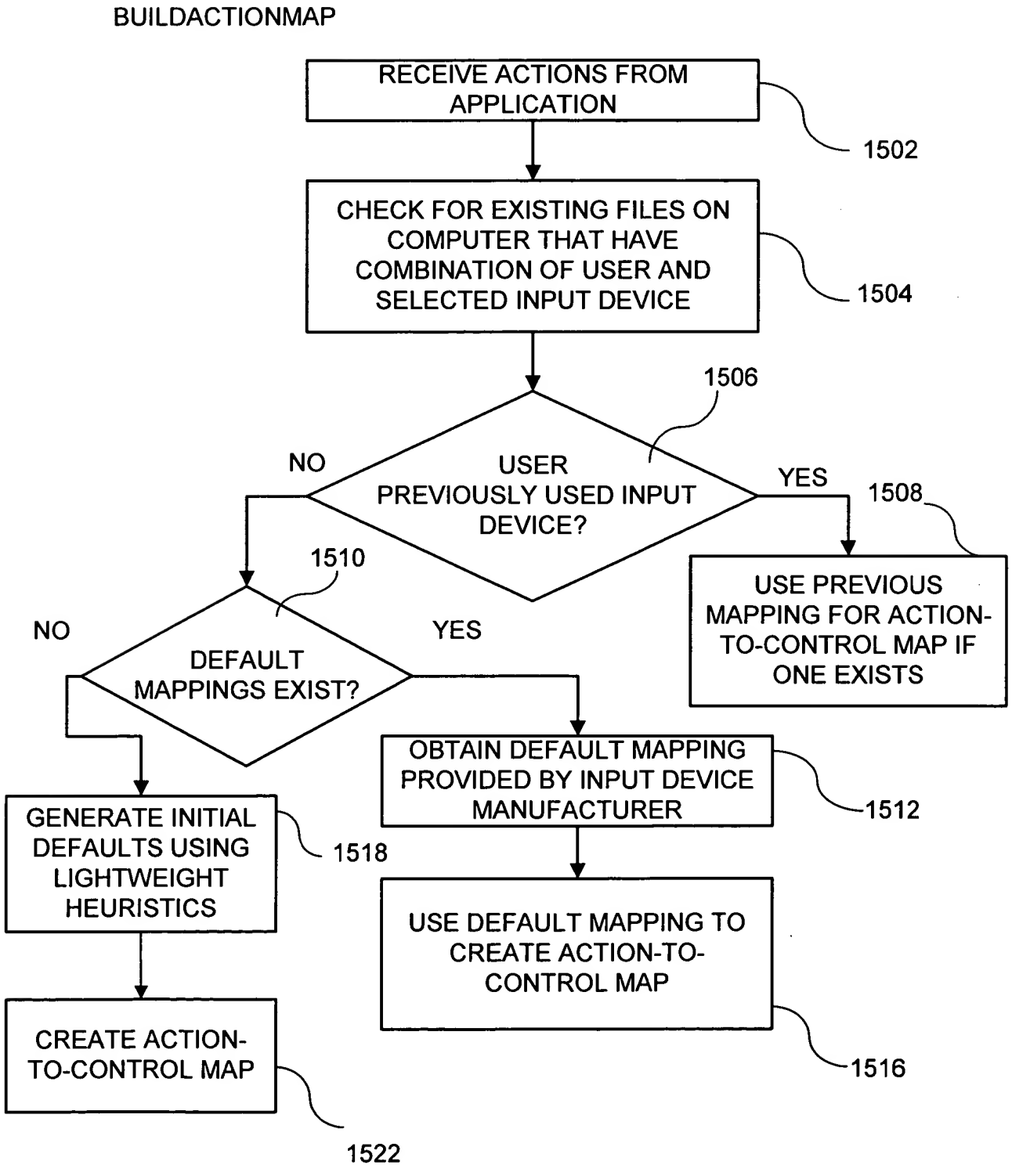

BUILDACTIONMAP
RECEIVE ACTIONS FROM APPLICATION
1502
CHECK FOR EXISTING FILES ON COMPUTER THAT HAVE COMBINATION OF USER AND SELECTED INPUT DEVICE
1504
1506
USER PREVIOUSLY USED INPUT DEVICE?
NO
YES
1508
USE PREVIOUS MAPPING FOR ACTION-TO-CONTROL MAP IF ONE EXISTS
1510
DEFAULT MAPPINGS EXIST?
NO
YES
OBTAIN DEFAULT MAPPING PROVIDED BY INPUT DEVICE MANUFACTURER
1512
GENERATE INITIAL DEFAULTS USING LIGHTWEIGHT HEURISTICS
1518
USE DEFAULT MAPPING TO CREATE ACTION-TO-CONTROL MAP
1516
CREATE ACTION-TO-CONTROL MAP
1522

Figure 16

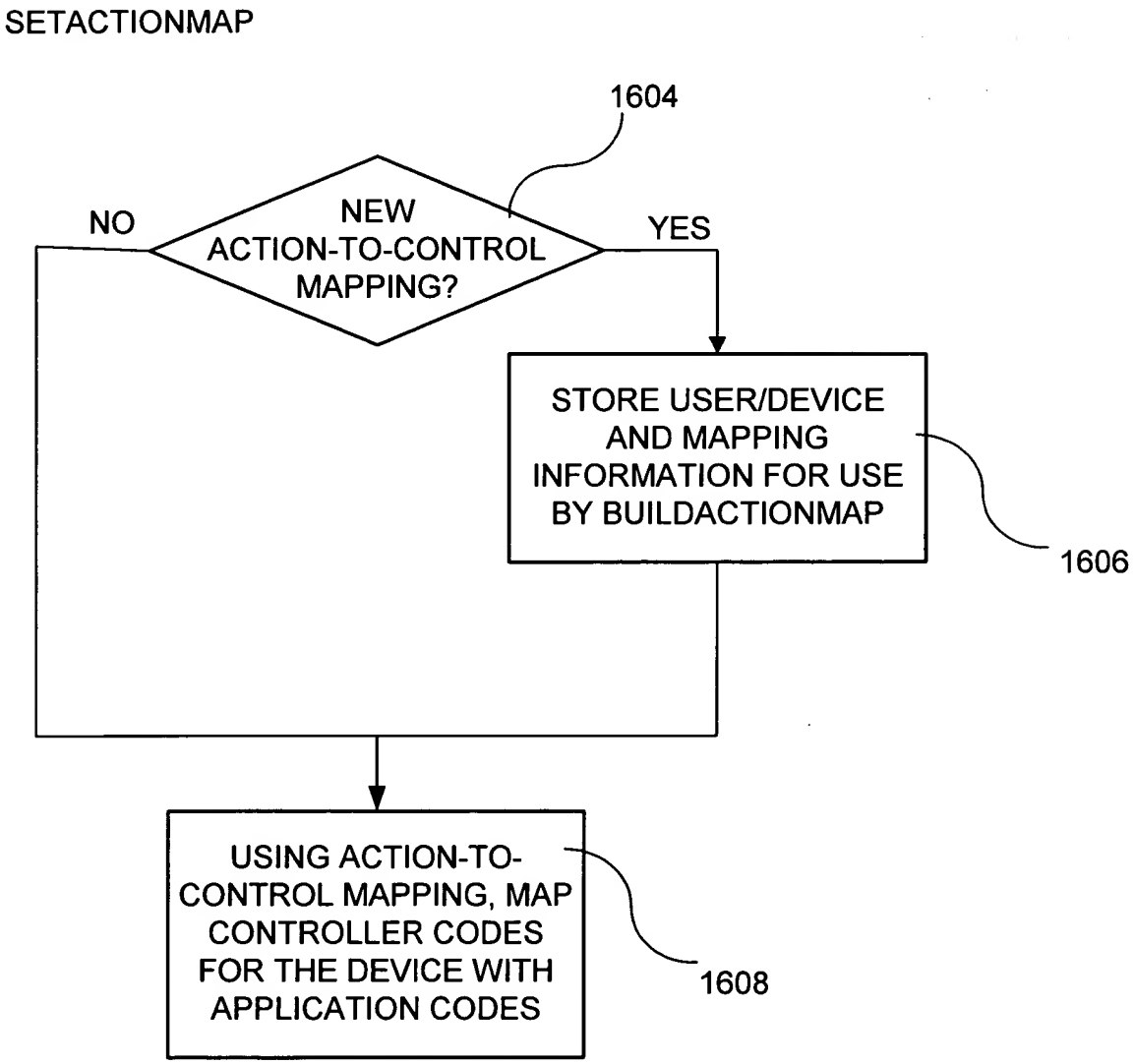
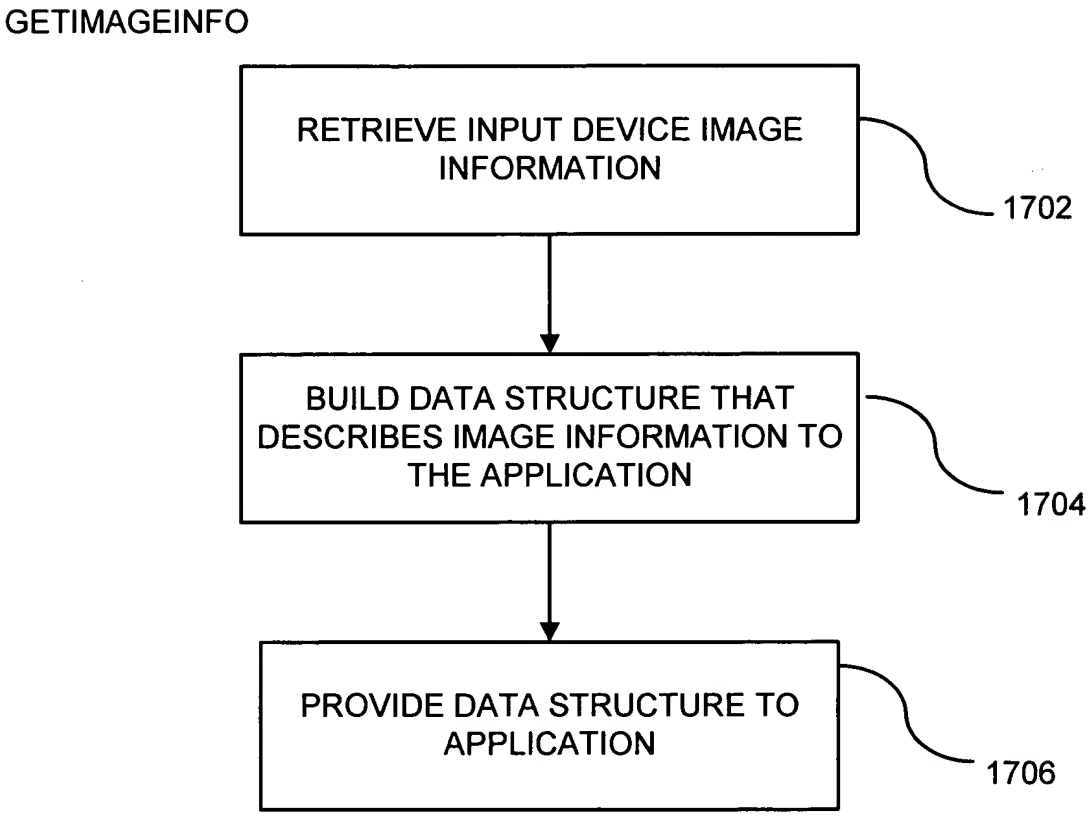

SETACTIONMAP
1604
NEW ACTION-TO-CONTROL MAPPING?
NO
YES
STORE USER/DEVICE AND MAPPING INFORMATION FOR USE BY BUILDACTIONMAP
1606
USING ACTION-TO-CONTROL MAPPING, MAP CONTROLLER CODES FOR THE DEVICE WITH APPLICATION CODES
1608

Figure 17


GETIMAGEINFO
RETRIEVE INPUT DEVICE IMAGE INFORMATION
1702
BUILD DATA STRUCTURE THAT DESCRIBES IMAGE INFORMATION TO THE APPLICATION
1704
PROVIDE DATA STRUCTURE TO APPLICATION
1706